

## LAND AND FRESH-WATER MOLLUSCA.

BY W. T. BEDNALL,

Hon. Curator for Conchology, Public Museum, Adelaide.

[Plate I.]

The number of species collected is seven—one fresh-water and six land-shells—namely, *Bulinus* (one), *Helix* (four), *Bulimus* (two). The number of living specimens obtained was fairly large, when the excessive drought which prevailed throughout the journey of the party is taken into consideration. The species of *Bulinus*, the only fresh-water-shell taken, occurred in a waterhole at a locality at which the party camped at the very commencement of the Expedition, is one that is widely distributed throughout the province of South Australia. Of the four *Helices* procured one proved to be identical with a species discovered by Professor Tate at Waukaringa some years ago, whose description of it is included in this paper. Another is *Helix perinflata*, described many years ago, but still a scarce shell in collections; while the remaining two are new species. The two species of *Bulimi* are both well-known West Australian forms.

HELIX (GALAXIAS) PERINFLATA, *Pfr.*

Pro. Zool. Soc., 1863; *Cox*, Monograph Australian Land Shells.  
(Pl. I, fig. 6.)

This shell was first obtained by Mr. F. G. Waterhouse in the MacDonnell Ranges, Central Australia, when accompanying John Macdougall Stuart in his exploration across the continent, and was described by Pfeiffer in 1863 from the specimens there procured. It was the prevailing species collected by Mr. Helms, and specimens were taken from Mount Illbillee on the Everard Range, westward to the Victoria Desert. Those taken at the commencement of the journey answer most closely to the description transferred by Dr. Cox to his Monograph of the Land Shells of Australia. A feature of these particular specimens is that some of them are encircled with a somewhat broad rufous band just above the periphery, which in very many of the examples has a tendency to spread towards the suture. In others again there is not the slightest semblance of the band of colour, and it is evidently specimens of this type that were submitted to Dr. Pfeiffer, as he makes no mention of this character.

Of a number of living and mature shells received by me some two years since some do and some do not exhibit the band.

This species varies a great deal, not so much in shape as in thickness, and again in coloration. The typical form is solid, but by far the greater number of the shells obtained during the expedition are comparatively thin, and appear to be identical with a race of this species which has extended southwards from the MacDonnell Ranges, and of which we have examples collected at Wilson and Carrieton. At one locality a dwarf form was taken very much in size and shape like *Helix Flindersi*, Adams and Angas, but without the colour-bands of that species. In coloration the shell varies considerably; some are a creamy-white, others have a faint interrupted cloudy-reddish band just above the periphery; in others this band becomes a most distinctive marking, while in very many the band extends from the periphery to the suture, being darkest in the centre. In the dwarf examples the shell is of a uniform greenish hue, with a shining vitreous appearance.

A description of the animal of *H. perinflata* from MacDonnell Range—specimens supplied by me, is given by Mr. Hedley in Proc. Roy. Soc., Queensland, vol. 6, p. 250, 1889.

The species was taken at the following localities:—

At the Everard Range on gneissic rock, at an elevation of 1,800 feet.

Mount Illbillee Soakage, Everard Range, under fig-trees, at an elevation of 2,000 feet. It was here that the dwarf specimens with the vitreous appearance were taken in company with one of the normal form.

Near Camp 4. Amongst spinifex, on sandy soil with lime outcrop.

Twenty miles south-east of Camp 4. Under spinifex.

Between Everard and Birksgate Ranges.

Near Camp 8. Under fig-trees, on granite rock.

Near Camp 10. In debris, under fig-trees, on granite rock.

Camp 14. Under granite rocks.

Birksgate Range. Amongst granite boulders under fig-trees.

Skirmish Hill. One dead specimen. On porphyritic rock.

Cavenagh Range.

Near large clay-pan. About three miles south of Camp 58, Victoria Desert.

Between Fraser Range and Yilgarn Goldfield.

HELIX (HADRA) FODINALIS, *Tate*.

(Pl. I, figs. 1a—1c.)

*Shell* moderately umbilicated, globosely conic, rather thin and somewhat glossy; surface coarsely- and closely-wrinkled trans-

versely, somewhat closely and finely incised-striate in a spiral direction.

Whorls four and a half, regularly convex, separated by a linear suture; first two and a half whorls almost smooth, but minutely granulated and obsolete wrinkled; the granulations disappear, and the wrinkles increase in strength and closeness with the revolution of the spire.

Last whorl somewhat inflated, slightly descending in front, base convex to the umbilical margin. Umbilicus moderately wide with precipitous sides, and towards the inner lip subangulated.

Aperture oblique, subcircular; peristome subacute, slightly reflected, margins not joined by a callus. Columella-margin dilated above and slightly extending over the umbilicus.

Colour, a pale-brown above, paler beneath, sometimes with a narrow reddish-brown infuscation in front of the suture.

*Animal*:—Foot of a chestnut colour with grey rugosities, broad and short behind; eye-pedicels of a blackish and tentacles of a chestnut colour; collar milk-white.

*Dimensions*:—Major and minor diameters, 18 mm. and 15 mm.; altitude, 14.25 mm.; height of aperture, 10 mm.; length of aperture, 9 mm.; diameters of umbilicus, 3 and 3.5 (vix.) mm.

*Affinities and Differences*:—The nearest ally of this species is *H. Nullarborica*, mihi, from which it differs in the absence of an impressed suture, finer and closer spiral striæ, larger umbilicus, as well as by coloration and thinness of test; it is related to *H. Angasiana*, Pfeiffer, but has more regularly convex whorls, coarser growth-lines, less-rotund and not so descending aperture, less thickened and reflected peristome. *H. bitaeniata*, Cox, is a more distant alliance, from which it differs mainly by its less-elevated spire and large umbilicus.

*Habitat*.—Taken alive in considerable numbers in March, 1876, beneath blocks of stones on the outcrop of the auriferous reef at Waukaringa, S. Australia.—*R. Tate*.

Between Victoria Spring and Fraser Range. One dead specimen.

HELIX (HADRA) EVERARDENSIS, *spec. nov.*

(Pl. I., figs. 3a—3c.)

Shell umbilicated, globosely conical, somewhat thin, translucent; lower whorls closely ribbed by stout irregular and oblique flat-topped costæ, which are coarsest behind the aperture, and gradually fade away on the upper whorls into fine striæ; under the lens irregularly pitted throughout; epidermis, pale yellow, much abraded, exposing in places the chalky-white of the shell substance; encircled immediately above the periphery by a

chocolate zone about a millimetre broad, and beneath the suture, which is impressed, a slightly narrower band of the same hue, the intervening space being wider than either band, the spire is so coiled that the suture throughout its extent divides the lower band of the upper whorl from the upper band of the succeeding one, lip of aperture white; whorls four and a half, gradually increasing, evenly rounded from the suture to the base, last descending in an alignment with the peripheral band; aperture very oblique, oval-lunate, slightly expanded and reflected above, and much so beneath; columella remarkable for its wide and straight expansion, callus thin, transparent; umbilicus narrow, deep, and spiral, abrupt at the margin and steep within, partially overhung by the dilated columella, and slightly choked by an internal swelling of the termination of the last whorl.

*Dimensions.*—Major diameter, 13 mm.; minor, 11.5 mm.; alt., 9.25 mm.; height and length of aperture, 6.75 mm.; diam. of umbilicus, 2.5 mm.

This species, of which only a single specimen was obtained, is the smallest member of the subgenus *Hadra* yet known, and comes very close to one taken during the expedition to Lake Eyre in the years 1874-5, of which there are two examples in the South Australian Museum collection.

Mr. Brazier on seeing the shell noted its very close resemblance to *H. australis*, Menke, but the figure of that species as reproduced in Dr. Cox's monograph could not be taken as a guide to its identification.

Near Illbillee Soakage, Everard Range, at an elevation of 2,000 feet.

HELIX (HADRA) ELDERI, *spec. nov.*

(Pl. I., figs. 2a—2c, 4, 5.)

Shell umbilicated, depressedly globose, thin, translucent, coarsely obliquely striated, more so at the suture; yellowish-white, and having two rufous bands, one, the broader, just above the periphery, and the other at the suture, the suture being wound round the centre of the lower band of the preceding whorl, and the right margin of the peristome inserted at the lower edge of this band; spire elevated, obtuse at the apex. Whorls five, convex, regularly increasing, the last rounded and inflated at the base in the region of the lip, descending slightly in front; aperture oblique, roundly lunate, margins approximating, peristome thin, broadly reflected, and very effusely dilated; columellar margin narrowly expanded above, and reflected over and partially concealing the umbilicus.

*Measurements.*—Major diam., 17 mm.; minor diam., 14 mm.;

alt., 12 mm.; height and length of aperture, 10 mm.; diameter of umbilicus, 2 mm.

This species is allied in its general characters to many South Australian congeners, and is also ornamented with the rufous bands so peculiar to the most of them, but is specially remarkable for the very effuse dilatation of the outer lip, more particularly so where it reaches the base of the shell.

Birksgate Range; under fig-trees amongst granite boulders.

The following anatomical notes are furnished by Mr. C. Hedley, F.L.S., of the Australian Museum:—

Two shells, containing the snails of *Hadra Elderi*, Bednall, were examined. The animals were much attenuated, and had evidently been captured during the course of a long fast. The aperture was sealed by a tough leathery epiphragm, behind which was packed a mass of congealed mucus, the snails having retired more than half-a-whorl within the shell. Though the shells indicated mature individuals, the genital system was shrunk into the condition of a half-grown animal, the consequence probably of starvation. I was therefore unable to make any observations upon this portion of their anatomy.

The jaw (pl. I, fig. 4) is rather wide, boomerang-shaped, crossed by seven stout ribs which denticulate the concave but not the convex margin, ends rounded.

Radula (pl. I, fig. 5) strap-shaped, measuring 6 x 2 mm; formula 28:12:1:12:28. Rachidian cusp single, ovate-lanceolate, apex projecting beyond the basal margin; base broadly expanded anteriorly. Immediate laterals larger than the rachidian, cusps stout ovate, the tips overlapping the base; alate angle of the base expanded. In the remoter laterals the cusps grow more slender, and the bases diminish. Transition teeth show a distal accessory cusp budding from the base of the main cusp; then a proximal cusp appears near the summit of the main cusp. In the marginals these accessory cusps increase relatively while the teeth diminish in size till the extreme marginals offer trifold blades.

BULIMUS DUX, *Pfr.*

(Proc. Zool. Soc., p. 24, 1861; *Cox*, Monograph Australian Land-shells, p. 74, pl. xiii., fig. 4.)

A dull whitish shell, nearly two inches in length, with the interior tinged with pale pink. No specimens taken alive.

Fraser Range (*Elder Expedition*); also King George's Sound (*Masters*).

BULIMUS MELO, *Quoy et Gaimard*

(Voy. d'Astrolabe, Zool., vol. II., p. 110, pl. ix., fig. 6-7; *Cox*, Monograph Australian Land-shells, p. 74, pl. xiii., fig. 6.)

A somewhat solid inflated shining shell, of which there are several varieties showing special markings. Specimens taken by the Expedition were dead, but their form is sufficient for purposes of identification.

Between Victoria Spring and Fraser Range; and Fraser Range (*Elder Expedition*). Also King George's Sound (*Quoy et Gaimard* and *Masters*), Fremantle (*Bacon*).

BULINUS NEWCOMBI, *Adams and Angas*.

(P. Z. S. p., 416, 1863; *Reeve*, *Con. Icon.*, pl. 3, f. 21.)

This species has a much inflated and somewhat produced aperture. It is widely distributed throughout the colony of South Australia; the type specimens are recorded from Mt. Margaret, Central Australia. It occurs in many of the streams flowing from the Flinders Range—in Mannanarie Creek at Wirrabara; in the Rocky River at Laura; in the Nelshaby Reservoir; also on Eyre Peninsula (*Tate*); and in more southern localities it has been taken in the River Para (*Tate*), the River Angas at Strathalbyn, and in the South-East at Penola, Binnun, and other adjacent localities by the late Mr. Tomsett.

Upper Arkaringa Creek (*Elder Expedition*).